

IN THE DRAWINGS

The attached sheets of drawings include changes to Figs. 1 and 2. These sheets, which include Figs. 1 and 2, replace the original sheets including Figs. 1 and 2.

Attachment: Replacement Sheets

### REMARKS/ARGUMENTS

Favorable reconsideration of this application, in view of the present amendment and in light of the following discussion, is respectfully requested.

Claims 11-25 are pending. By the present amendment, Claims 11, 13, 14, 16, and 22 are amended; and Claims 24 and 25 are added. Support for the present amendment can be found in the originally filed specification, for example, at page 2, lines 19-30, at page 3, lines 24-32, and at page 5, line 13 to page 7, line 10. Thus, it is respectfully submitted that no new matter is added.

In the outstanding Office Action, the drawings and specification were objected to; Claims 11, 12, 14, and 23 were rejected under 35 U.S.C. §102(b) as anticipated by Kim (Korean Patent No. 2001-093359); Claims 15-17, 20, and 22 were rejected under 35 U.S.C. §103(a) as unpatentable over Kim in view of Shimanuki et al. (U.S. Patent No. 6,777,121, hereinafter “Shimanuki”); Claim 13 was rejected under 35 U.S.C. §103(a) as unpatentable over Kim in view of Rusch et al. (International Patent Publication No. WO 97/41169, hereinafter “Rusch”) and Wilkinson et al. (U.S. Patent 5,366,818, hereinafter “Wilkinson”); and Claims 18, 19, and 21 were rejected under 35 U.S.C. §103(a) as unpatentable over Kim in view of Rusch and Wilkinson, and further in view of Menard (U.S. Patent 4,001,041).

In response to the objection to the drawings, replacement drawings are submitted herewith to correct the informalities noted in the outstanding Office Action. No new matter is added. Therefore, it is respectfully requested that the outstanding objection to the drawings be withdrawn.

In response to the outstanding objection to the specification, the specification is amended to include the appropriate headings as suggested by the outstanding Office Action. No new matter is added. Therefore, it is respectfully requested that the outstanding objection to the specification be withdrawn.

Turning now to the outstanding rejections under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), these rejections are respectfully traversed.

Claim 11 recites, *inter alia*, an electric propulsion system for a motor vehicle including “an electrolytic membrane disposed between the two electrodes, wherein the electrolytic membrane contains conductive charges of protons distributed in a concentration gradient within a thickness of the membrane.” As explained in the original specification, for example, at page 3, lines 24-32, Applicants’ invention improves upon conventional devices because the process of back diffusion towards the anode of part of the water produced at the cathode is limited. The claimed invention thus leads to an improved electric propulsion system for a motor vehicle.

Kim describes a fuel cell with a first ion conductive polymer layer and a second ion conductive polymer membrane.<sup>1</sup> Specifically, Kim describes a first ion conductive polymer layer that includes a material phase superior ion exchange process polymer and a material to improve the water absorption ability of the ion conductive polymer layer.<sup>2</sup> Kim also describes a second ion conductive polymer membrane that has the same ion exchange process polymer as the first ion conductive polymer layer with a metallic catalyst to increase a reaction within the anode.<sup>3</sup>

However, it is respectfully submitted that Kim does not disclose or suggest “the electrolytic membrane contains conductive charges of protons distributed in a concentration gradient within a thickness of the membrane,” as recited in amended Claim 1.

Instead, as discussed above, Kim describes that the first ion conductive polymer layer and the second ion conductive polymer membrane that have a same ion exchange process polymer, with different compounds added to different layers. Thus, Kim does not disclose or suggest that the multilayered ion conductive layers include a concentration gradient with

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<sup>1</sup> See Kim, at the Effect of Invention section, first paragraph.

<sup>2</sup> See Kim, at the Structure and Function of the Invention section, first and second paragraphs.

<sup>3</sup> See Kim, at the Structure and Function of the Invention section, first and ninth paragraphs.

respect to the ion exchange properties of the layers. Therefore, the first ion conductive polymer layer and the second ion conductive polymer membrane described in Kim are not the claimed “electrolytic membrane.”

Therefore, it is respectfully submitted that Kim does not disclose or suggest every feature recited in amended Claim 11. Thus, it is respectfully requested that the outstanding rejection of Claim 11, and all claims dependent thereon, as anticipated by Kim be withdrawn.

Claim 22 recites, *inter alia*, a method for using a fuel cell stack in an electric propulsion system for a motor vehicle, including “concentrating water in a liquid state produced by the fuel-cell stack at one of two electrodes by an electrolytic membrane containing conductive charges of protons distributed in a concentration gradient within a thickness of the membrane.” As discussed above, Kim does not disclose or suggest such an electrolytic membrane.

Shimanuki describes a fuel cell system 10 including a fuel cell stack 40 with a solid polymer ion exchange membrane 44 interposed between the hydrogen side electrode 46 and the air side electrode 48.<sup>4</sup>

The outstanding Office Action does not rely on Shimanuki as describing the claimed “concentrating” step. Additionally, Applicants respectfully submit that Shimanuki fails to make up for the deficiencies of Kim noted above.

Therefore, even assuming the combination of Kim and Shimanuki to be proper, it is respectfully submitted that this combination does not disclose or suggest every feature recited in Claim 22. Therefore, it is respectfully requested that the outstanding rejection of Claim 22 as unpatentable over Kim in view of Shimanuki be withdrawn.

With regard to the rejection of Claims 15-17 and 20 as unpatentable over Kim in view of Shimanuki, it is noted that Claims 15-17 and 20 are dependent on Claim 11, and thus are

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<sup>4</sup> See Shimanuki, at column 3, lines 6-15.

believed to be patentable for at least the reasons discussed above with respect to Claim 11. Further, it is respectfully submitted that Shimanuki does not cure any of the above-noted deficiencies of Kim. Accordingly, it is respectfully submitted that Claims 15-17 and 20 are patentable over Kim in view of Shimanuki.

With regard to the rejection of Claim 13 as unpatentable over Kim in view of Rusch and Wilkenson, it is noted that Claim 13 is dependent on Claim 11, and thus is believed to be patentable for at least the reasons discussed above. Further, it is respectfully submitted that Rusch and Wilkenson do not cure any of the above-noted deficiencies of Kim. Accordingly, it is respectfully submitted that Claim 13 is patentable over Kim in view of Rusch and Wilkenson.

With regard to the rejections of Claims 18, 19, and 21 as unpatentable over Kim in view of Rusch and Wilkenson, and further in view of Menard, it is noted that Claims 18, 19, and 21 are dependent on Claim 11, and thus are believed to be patentable for at least the reasons discussed above. Further, it is respectfully submitted that Rusch, Wilkenson, and Menard do not cure any of the above-noted deficiencies of Kim. Accordingly, it is respectfully submitted that Claims 18, 19, and 21 are patentable over Kim in view of Rusch and Wilkenson, and further in view of Menard.

New Claims 24 and 25 find support in the originally filed specification, for example, at page 5, line 13 to page 7, line 10 and page 2, lines 19-30. Thus, it is respectfully submitted that no new matter is added.

Claim 24 recites, *inter alia*, an electric propulsion system for a motor vehicle, including an electrolytic membrane and “the electrolytic membrane contains conductive charges of protons distributed in a concentration gradient such that a maximum concentration of a conductive charges of protons within a thickness of the membrane is located closest to

the first electrode to concentrate water in a liquid state produced by the fuel-cell stack at the first electrode.”

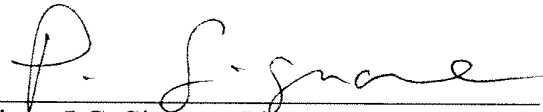
Apparent from the above descriptions of the cited references, it is respectfully submitted that none of the cited references disclose or suggest the claimed “electrolytic membrane.” Therefore, it is respectfully submitted that Claim 24, and Claim 25 which depends thereon, patentably define over the cited references.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. A Notice of Allowance is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants’ undersigned representative at the below listed telephone number.

Respectfully submitted,

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